Algebra 2 Semester 1 Final Exam Practice

Describe the transformation of $f(x) = x^2$ represented by *g*. Then graph

____ 1. Find the function : x-intercepts of 7 and –2; passes through $(3,-40)$

A. $y = -\frac{1}{2}(x+7)(x-2)$

B. $y = -2(x+7)(x-2)$

C. $y = \frac{1}{2}(x-7)(x+2)$

D. $y = 2(x-7)(x+2)$

Write a rule for *g* described by the transformations of the graph of *f*. Then identify the vertex.

____ 2. $f(x) = x^2$; vertical shrink by a factor of $\frac{1}{3}$ and a reflection in the *x*-axis, followed by a translation 1 unit right.

A. $g(x) = -\frac{1}{3}(x-1)^2;\ (1,0)$

B. $g(x) = \frac{1}{3}x^2 - 1;\ (0,-1)$

C. $g(x) = -3(x-1)^2;\ (1,0)$

D. $g(x) = \frac{1}{3}(x-1)^2;\ (1,0)$

Solve the equation.

____ 3. $3(x-6)^2 - 6 = 1$

A. $x = 6 \pm \sqrt{21}$

B. $x = 6 \pm \frac{\sqrt{21}}{3}$

C. $x = -15$ and $x = 27$

D. $x = -6 \pm \frac{\sqrt{21}}{3}$

____ 4. $2y^2 + 31y = 7y - 70$

A. $y = 7$ and $y = 5$

B. $y = 35$

C. no real solution

D. $y = -5$ and $y = -7$

____ 5. $19x + 32 = -3x^2$

A. $x = \frac{-19 \pm i\sqrt{23}}{6}$

B. $x = \frac{-19 \pm \sqrt{23}}{6}$

C. $x = \frac{19 \pm i\sqrt{23}}{6}$

D. $x = \frac{19 \pm \sqrt{23}}{6}$

Solve the system.

____ 6. $-y = -2x + 2$

$-2x^2 + y = -2x - 72$

A. $(-5, -12)$

B. $(-5, 14)$ and $(7, -12)$

C. $(-5, -12)$ and $(7, 12)$

D. no solution

Solve the inequality. Round decimal answers to the nearest hundredth.

____ 7. $x^2 + 13x + 36 > 0$

A. $4 < x < 9$

B. $x < -9$ or $x > -4$

C. $-9 < x < -4$

D. $x < 4$ or $x > 9$

Perform the operation. Write the answer in standard form.

____ 8. $(-5 + 4i)(-8 + 7i)$

A. $12 + 8i$

B. $68 + 8i$

C. $68 - 67i$

D. $12 - 67i$

____ 9. Which statement is true about the quadratic function $y = x^2 + 9x + 10$?

A. The vertex form is $y = \left(x + \frac{9}{2}\right)^2 - \frac{41}{4}$.

B. To complete the square, add $\frac{9}{2}$ to each side of the equation.

C. The vertex of the graph is $\left(-\frac{41}{4}, -\frac{9}{2}\right)$.

D. The vertex form is $y = \left(x - \frac{9}{2}\right)^2 + \frac{41}{4}$.

____ 10. Find the discriminant of the quadratic equation $-8x - 18 = x^2$ and describe the number and type of solutions of the equation.

A. 8; two imaginary solutions

B. –8; two imaginary solutions

C. –8; one real solution

D. 8; one real solution

____ 11. A boy throws a ball into the air. The equation $h = -16t^2 + 34t + 5$ models the path of the ball, where *h* is the height (in feet) of the ball *t* seconds after it is thrown. How long is the ball in the air? Round your answer to the nearest tenth of a second.

A. about 1.1 sec

B. about 4.5 sec

C. about 2.3 sec

D. about –0.1 sec

Divide using polynomial long division.

____ 12. $(9x^4+4x+17)\div(x^2+3x-5)$

A. $9x^2+27x+36+\dfrac{31x+197}{x^2+3x-5}$

B. $9x^2-27x+126+\dfrac{517x-613}{x^2+3x-5}$

C. $9x^2-27x+126+\dfrac{-509x+647}{x^2+3x-5}$

D. $9x^2+27x+36+\dfrac{-23x-163}{x^2+3x-5}$

Factor the polynomial completely.

____ 13. $3b^{11}-1029b^8$

A. $3b^8(b-7)(b^2-7b+49)$

B. $3b^8(b+7)(b^2-7b+49)$

C. $3b^8(b-7)(b^2-49)$

D. $3b^8(b-7)(b^2+7b+49)$

____ 14. **Use Pascal's Triangle to expand the binomial.** $(c-3)^5$

A. c^5-243

B. $c^5+15c^4+90c^3+15c^2+405c+243$

C. $5c-15$

D. $c^5-15c^4+90c^3-270c^2+405c-243$

Find the zero(s) of the function.

____ 15. $p(x)=x^3+15x^2+71x+105$

A. $-7,-5,$ and -3

B. $-5, 3,$ and 7

C. $-7, 3,$ and 5

D. $-3, 5,$ and 7

Write a polynomial function *f* of least degree that has rational coefficients, a leading coefficient of 1, and the given zeros.

____ 16. $2, 4+i$

A. $f(x)=x^3-10x^2+33x+34$

B. $f(x)=x^3+10x^2-33x+34$

C. $f(x)=x^3-10x^2+33x-34$

D. $f(x)=x^3+33x^2+10x-34$

____ 17. $f(x)=2x^2+8$; horizontal stretch by a factor of 3 and a translation 1 unit up, followed by a reflection in the *y*-axis.

A. $f(x)=2\left(\dfrac{1}{3}x\right)^2+9;\ (0,9)$

B. $f(x)=2(3x)^2+9;\ (0,9)$

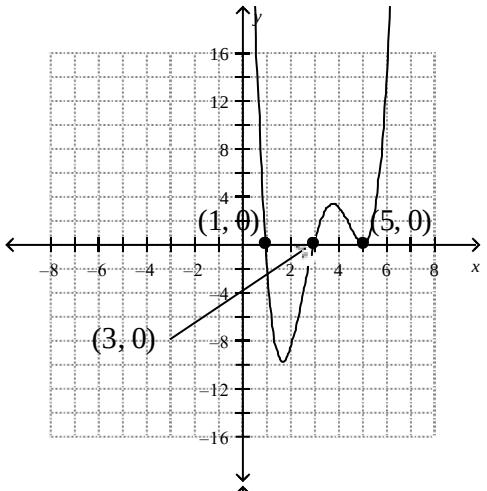
C. $f(x)=\dfrac{2}{3}x^2+9;\ (0,9)$

D. $f(x)=6x^2+9;\ (0,9)$

Graph the function.

____ 18. $g(x) = (x-5)^2(x-3)(x-1)$

A.



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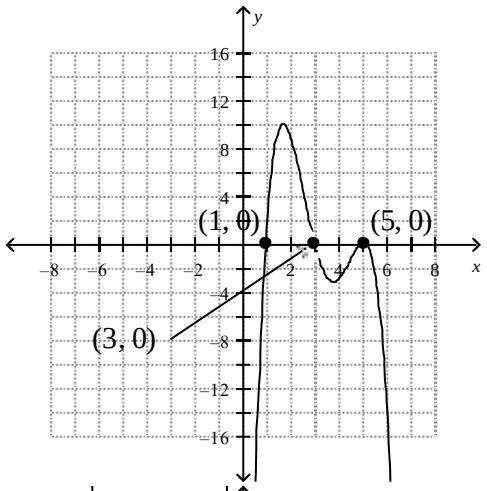

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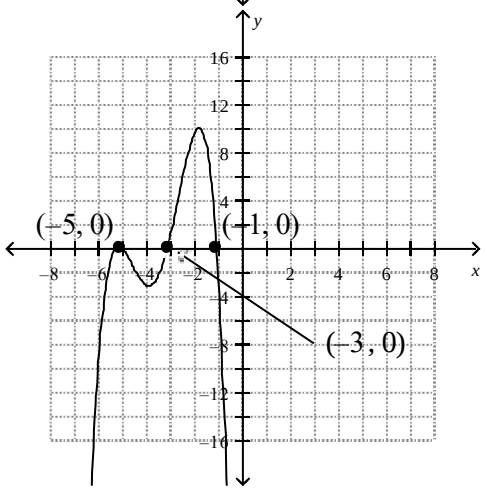
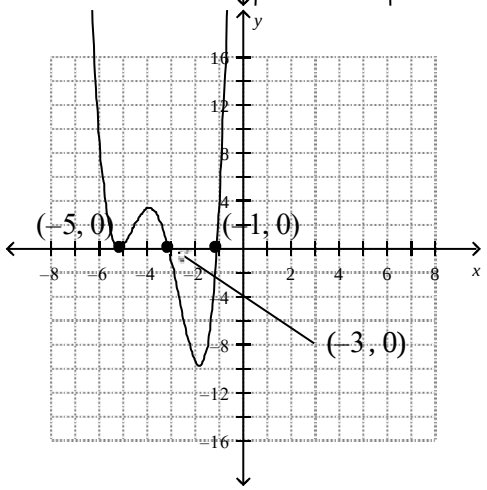
D.